

WE CLAIM:

1. An electromechanical input means for a portable electronic device, comprising:
 - a first layer of conductive or resistive material,
 - 5 - a second layer of conductive or resistive material, which second layer at least partly overlaps the first layer so that the overlapping parts of the first and second layers together are responsive to touching or pressing to produce an electric input signal to the portable electronic device,
 - a dielectric support layer for the first layer, and
 - 10 - a dielectric support layer for the second layer;wherein at least a part of the dielectric support layer for the first layer continues past the first layer and is bent back to act as the dielectric support layer for the second layer.
- 15 2. An electromechanical input means according to claim 1, wherein the dielectric support layer for the first layer and the dielectric support layer for the second layer are portions of a flexible printed circuit board that also comprises conductive tracks for realizing electrical connections between components attached to said flexible printed circuit board.
- 20 3. An electromechanical input means according to claim 1, wherein the overlapping parts of the first and second layers constitute a touch pad.
4. An electromechanical input means according to claim 3, additionally comprising
25 an additional layer between the first and second layers, which additional layer acts as resilient isolation means between the overlapping parts of the first and second layers.
5. An electromechanical input means according to claim 1, wherein the overlapping
30 parts of the first and second layers constitute a key pad.
6. An electromechanical input means according to claim 5, wherein:
 - the part of the first layer that overlaps with the second layer comprises patches of intertwined, conductive fingers and

- the part of the second layer that overlaps with the first layer comprises conductive patches at locations that coincide with said patches of intertwined, conductive fingers in the first layer;

so that the overlapping parts of the first and second layers are responsive to pressing
5 to produce an electric input signal that results from a galvanic connection which a conductive patch in the second layer causes between fingers in the first layer.

7. An electromechanical input means according to claim 5, wherein the dielectric support layer for the second layer comprises dome-shaped deformations each having a
10 convex side and a concave side, of which the concave sides of the dome-shaped deformations are towards the first layer and comprise the second layer in the form of conductive patches.

8. An electromechanical input means according to claim 1, additionally comprising
15 other layers that are conductive or resistive and supported by a dielectric layer that is of the same piece of material as the dielectric support layer of the first and second layers.

9. An electromechanical functional module for a portable electronic device, comprising:
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- a flexible printed circuit board for supporting electronic components and conductive tracks between electronic components,
- a first layer of conductive or resistive material on a surface of the flexible printed circuit board, and
- 25 - a second layer of conductive or resistive material on a surface of the flexible printed circuit board;

wherein a portion of the flexible printed circuit board separates the first layer from the second layer, thus allowing the flexible printed circuit board to be bent around an imaginary axis crossing said portion of the flexible printed circuit board, so that after
30 bending the second layer comes to at least partly overlap the first layer, and the overlapping parts of the first and second layers together are then responsive to touching or pressing to produce an electric input signal to the portable electronic device.

10. An electromechanical functional module according to claim 9, wherein the
35 flexible printed circuit board also comprises electronic components attached thereto, and the conductive tracks connect at least one of said electronic components to the

first and second layers for allowing electric input signals produced in the first and second layers to propagate to at least one of said electronic components.

- 5 11. An electromechanical functional module according to claim 9, wherein the first and second layers are located on a same surface of the flexible printed circuit board, so that bending the flexible printed circuit board 180 degrees around an imaginary axis crossing said portion of the flexible printed circuit board brings the first and second layers against each other with no part of the flexible printed circuit board therebetween.
- 10 12. An electromechanical functional module according to claim 11, additionally comprising an additional layer on top of at least one of the first and second layers, so that bending the flexible printed circuit board 180 degrees around an imaginary axis crossing said portion of the flexible printed circuit board brings the first and second layers against each other with said additional layer therebetween.
- 15 13. An electromechanical functional module according to claim 9, wherein the first and second layers are located on different surfaces of the flexible printed circuit board, so that bending the flexible printed circuit board 180 degrees around an imaginary axis crossing said portion of the flexible printed circuit board brings the first and second layers into a stack where a part of the flexible printed circuit board lies between the first and second layers.
- 20 14. An electromechanical functional module according to claim 9, comprising the following components attached to the flexible printed circuit board:
- an engine module of a portable telephone device,
 - a display,
 - a microphone and
 - a loudspeaker.
- 30 15. A portable electronic device, comprising:
- a flexible printed circuit board,
 - an engine module, which is a microprocessor, attached and electrically connected to the flexible printed circuit board, and
 - 35 - electromechanical input means for producing electric input signals for the engine module;

wherein the electromechanical input means comprise a first layer of conductive or resistive material on a surface of the flexible printed circuit board, and a second layer of conductive or resistive material on a surface of the flexible printed circuit board, which second layer at least partly overlaps the first layer, and wherein the flexible
5 printed circuit board acts as a dielectric support layer for the first layer and continues past the first layer and is bent back to act as the dielectric support layer for the second layer.

16. A portable electronic device according to claim 15, additionally comprising a
10 battery pack having a planar side surface, which battery pack is located with its planar side surface parallel to the first and second surfaces on an opposite side of the flexible printed circuit board than the first and second surfaces, so that said planar side surface of the battery pack acts as a mechanical support for the flexible printed circuit board at the location of the overlapping parts of the first and second layers.

15 17. A method for manufacturing electromechanical input means for a portable electronic device, comprising the steps of:
- producing a first layer of conductive or resistive material onto a surface of a dielectric support layer,
20 - producing a second layer of conductive or resistive material onto a surface of the same dielectric support layer, into a non-overlapping location with said first layer,
- producing conductive connections onto said dielectric support layer to facilitate conveying electric input means produced in said first and second layers to other parts of the portable electronic device and
25 - bending the dielectric support layer into a position in which said first and second layers at least partly overlap each other.

18. A method according to claim 17, additionally comprising the step of producing an additional layer of insulating material on top of at least one of said first and second
30 layers before bending the dielectric support layer, so that subsequently bending the dielectric support layer results in a stack where said additional layer is located between the overlapping parts of said first and second layers and acts as resilient isolation means.

35 19. A method according to claim 17, additionally comprising a step of permanently deforming the dielectric support layer at certain locations coinciding

with at least one of said first and second layers in order to produce resilient domes made of the dielectric support layer.